



Electronic Document Management Systems

CHIEF INFORMATION OFFICER
WORKING GROUP REPORT
OF FINDINGS

EDMS: getting the right information
to the right people at the right time

Electronic Document Management Systems



CIO Working Group Report of Findings

*EDMS: getting the right information to the right people
at the right time*

PREPARED BY THE MIAMI-DADE COUNTY
CIO WORKING GROUP ON ELECTRONIC DOCUMENT MANAGEMENT &
IMAGING SYSTEMS

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Executive Summary

Knowledge is power. We've all heard that, and most of us believe it. Knowledge, however, takes a variety of forms; some is well managed, and some is not. The county does an excellent job managing its databases and its line-of-business applications. But 80 to 90 percent of the knowledge in the county falls outside of these traditional knowledgebases that we consider "well managed." What about knowledge in local departmental systems? It is, most likely, well managed, but is it available to everyone in the county who might need it? What about printed manuals, local paper files, papers on the tops of desks, or in hard drives on desk and laptop computers? What about email?

The truth is that most of the knowledge in the county is not readily available. Industry studies have shown that a much larger percentage of people's time is still spent searching for rather than actually using critical information. It is this basic problem that is addressed by the Electronic Document Management System (EDMS) Working Group. Our primary mission is to find a way to get the right information to the right people at the right time.

EDMS consists of four distinct technologies: document management, imaging, workflow, and computer output to laser disk (COLD). Document management systems manage the creation, revision and use of electronic documents. We search for them, we check them in and out, manage versions, and keep them secure. Such systems improve usability, accessibility, security and control.

Imaging is the conversion of paper documents to digital images. Images are indexed and imaging systems provide fast, on-line access. Such systems reduce paper handling and improve accessibility.

Workflow automates the movement or routing of electronic documents through a business process. Workflow systems result in time saving and productivity improvement.

COLD takes print files originating in a mainframe, indexes them and stores them in electronic folders in a document management or imaging system. Users are provided on-line access to the "print" files. Such systems provide access to information that was not previously available electronically – they replace printouts and improve accessibility.

Each of these technologies has something to offer. Interestingly, not too long ago each of these technologies had to be implemented separately with independent products. Now, in combination, in the form of integrated EDMS, their impact can be extraordinary.

The Chief Information Officer (CIO) established the EDMS Working Group in late 1999 to:

- Provide recommendations for the deployment of technology to meet the future imaging, electronic document management and workflow requirements of the county
- Review available EDMS software and recommend alternatives to the CIO

- Coordinate the implementation of a pilot project to assess EDMS software capabilities
- Serve as an information clearinghouse regarding imaging, electronic document management, and workflow technology
- Provide a countywide forum for the discussion of functional and technical issues related to the implementation of EDMS technology
- Review imaging, electronic document management, records management, and workflow standards and procedures
- Recommend organizational structures/processes that will facilitate the introduction of EDMS into Miami-Dade County

Recommendations:

Implement an integrated EDMS- EDMS integrated solutions provide imaging, document management, workflow and COLD in a single system. By implementing an EDMS integrated solution, Miami-Dade County can expect to obtain the following benefits:¹

- Simplifies maintenance of the EDMS system for administrators and information technology (IT) staff
- Reduces the cost of training and eliminates the need for users to know or care where documents reside
- Offers a better chance for acceptance across a wide-range of departments
- Results in potentially fewer problems with software upgrades than might otherwise be encountered in systems that use products from multiple vendors
- Reduces integration efforts that would otherwise be required with “best-of-breed” systems
- Simplifies integration with critical systems

Engage Identitech for Pilot- Based on its research, the Working Group recommends a pilot project be implemented using the FYI software from Identitech. Identitech’s FYI tightly integrates the major functions of interest to Miami-Dade County departments; namely, imaging, workflow, on-line document management, records management, and COLD, and provides significant out-of-the-box functionality. In addition, much of FYI’s functionality can be extended to web users with a native browser (Netscape or Microsoft) without a “plug-in.”

¹ Special Report on EDMS Integrated Solutions. Doculabs, First Edition (1.1), 1999.

Limit Scope of Pilot Project – The identified pilot project should be of limited scope, and conducted with the direct assistance of the selected vendor. In addition, a thorough evaluation of the product should be conducted prior to rolling out the technology to other departments.

A process reengineering policy should be adopted– Workflow is of critical importance because it offers more tangible benefits than any other function of an EDMS. In order to implement workflow properly, and to take full advantage of its capabilities, implementing departments must be willing to reengineer their business processes.

Take full advantage of out-of-the-box functionality – One of the essential reasons the FYI product of Identitech was selected for evaluation in a pilot project was the functionality that can be implemented without significant custom development. It is recommended that the county take advantage of this feature and exploit the native functions in the software without investing significant resources in custom development projects.

Appoint EDMS Administrator - The Working Group recommends that an EDMS Administrator be identified and tasked to manage and evaluate the pilot project and to develop a long-range plan for the introduction and use of EDMS technology in Miami-Dade County. The EDMS administrator should work closely with departmental representatives to ensure that clear goals and objectives for the pilot project are developed. The EDMS Administrator should have a staff capable of facilitating the introduction of technology, with skills in requirement analysis, project planning, business process redesign, project management, project evaluation, etc. This Administrator and his/her team should report to the CIO.

Establish EDMS Implementation Team - The Working Group recommends that an EDMS Implementation Team be created. This team would report to the CIO through the EDMS administrator and focus on the initial stages of the system development life cycle, such as establishing business requirements, conducting needs assessment, planning for personnel retraining, and the like. However, while internal staff best performs this function, an alternative would be to use an integrator to help move the technology out to departments.

Identify and Establish Core Competencies - The Working Group recommends that the CIO develop and implement policy related to the core competencies required to use EDMS technology effectively. In this regard, the CIO should clearly define the role and responsibility of the Information Technology Department (ITD) as they relate to the implementation of web-based and distributed systems.

Engage Strategic Consultant - The Working Group recommends that the CIO engage an external IT consultant to assist in the formulation of a strategic plan that encompasses the full range of technologies under review by CIO-created working groups. This would include, at a minimum, EDMS, e-government, and portal strategy. This strategic IT consultant should be available to provide guidance, through the EDMS administrator, to departmental staff in the development of tactical implementation plans and in evaluating progress toward goals.

Ensure Records Management Retention Principles are maintained - As EDMS are implemented, more and more documents will exist only in electronic form. Retention schedules

are now routinely applied to paper-based documents and to master databases maintained at ITD. These same principles should continue to be implemented as the county migrates toward a paperless work environment that includes managed documents as well as e-mail. This would include, compliance with the Public Record Law; ensuring that each record has a retention schedule with an established retention period; verifying vital or historical records; and final disposition of records. While not responsible for the management of official records, the CIO should insist that as EDMS are implemented, records management retention standards be appropriately applied to electronic documents.

Outsource Backfile Scanning - A number of departments have a requirement to scan substantial numbers of documents now stored in file rooms. Miami-Dade County should provide centralized management of contracts to perform scanning and indexing of these paper documents on behalf of departments. Significant economies of scale can be achieved if this function is managed for the enterprise instead of by each department individually.

Implement Master Document Repository - Miami-Dade County should, as part of the pilot project identified herein, identify the requirements of, and take steps to implement a centralized document storage and archival site at ITD. This site should be maintained for the benefit of all county departments and include all necessary hardware and software to support the near-line, backup and archival needs of the EDMS.

Introduction

Miami-Dade County is a very large and diverse organization, with more than 27,000 employees and hundreds of physical locations. Those employees generate a lot of paperwork and must work with lots of information on a daily basis to do their jobs. Under the State of Florida Public Records law, all of the paperwork that is used to conduct business must be retained for at least one year after it is created, and many documents, such as birth certificates, marriage licenses and deeds must be kept for 20 years or more.

More than one department needs many documents. For instance, when an employee is hired, a file is created in the Employee Relations Department. The Department filling the vacancy also needs the information in that file. A copy is also sent to the employee.

Now imagine a computerized system that is used to process the information through an online form. Copies of the form can be reviewed online. Several departments at the same time can see copies of the form. The form can be stored in a digital archive for retrieval anytime in the future. With an Electronic Document Management System (EDMS) we can:

- Eliminate the need to pre-print forms.
- Stop transporting and storing blank forms.
- Save multiple data entries (and the potential for errors²) from being made. When the online form is filled out, the database is also created at the same time.
- Save the costs of transporting copies of the completed form to multiple destinations.
- Save time by making the form available immediately instead of waiting on mail or delivery.
- Save time in filing and retrieving the form.
- Enable faster searching through multiple records.
- Eliminate the use of expensive floor space for paper files.
- Create a better records management system for long-term retention.
- The same information can also be made available to the public through the Internet, with portions “redacted” or “blacked-out” due to privacy concerns.

Miami-Dade County can derive huge benefits from an integrated standardized document management system. Centralized data storage facilities will help reduce the overall costs to support the system and provide a better countywide record management solution. With a pilot program, many of the efficiencies this new technology promises will be demonstrated. In the future, every department will be able to adopt proven technologies to increase their own efficiency and effectiveness in responding to the demands of our employees and our citizens.

EDMS Working Group

When first established, the EDMS Working Group was to be called the Imaging Standards Working Group. After a very short time, it was clear that title was not descriptive of the

² Industry studies have indicated that the potential for error in data entry is estimated at 30%. Automation has been proven to bring this down to 2%.

technologies the Working Group was attempting to promote within the county. Specifically, it was evident that imaging systems related to only one of many different technologies which include, among others, document management, workflow, computer output to laser disk (COLD), and records management. Thus, after meeting only a few times the group decided to rename itself the “Electronic Document Management Systems and Imaging Working Group” (EDMS).

The EDMS Working Group was created by the Chief Information Officer (CIO) to meet the objectives outlined in his vision, and to obtain input from county departments regarding imaging, electronic document management and workflow requirements. Its goal is to make recommendations regarding a pilot project and to provide a direction for the further deployment of document management and imaging systems in Miami-Dade County.

To carry out its work, the Working Group was divided into two sub-groups to focus on 1) departmental requirements and 2) vendor offerings in the document management and imaging marketplace. The departmental requirements sub-group developed a brief survey designed to 1) identify existing county implementations of document management and imaging systems, and 2) determine which county departments were planning to implement such systems. In addition, the survey sought to collect some basic information about the document management and imaging requirements of these departments. The vendor requirements sub-group had the difficult task of surveying the marketplace for system solutions that would meet the needs of Miami-Dade County.

The Working Group discussed the possibility of conducting an extensive countywide requirements analysis. However, it was evident that such an effort was not within the scope of the Working Group, and not a requirement at this time. Based on the broad representation of county departments on the Working Group, and the results of the survey, it was determined that Miami-Dade County had at least one example of every kind of document management and imaging system requirement. Functional requirements identified included:

- Production-level imaging of millions of paper documents
- Capture and annotation of complex CAD drawings
- Color scanning and redaction of sensitive documents
- Enterprise-wide electronic form completion with multi-level signoffs
- Departmental and county-wide workflow
- Management of document life cycles based on pre-defined records management principles
- Custom application development using document management software as middleware
- Full participation of web clients in document management and workflow
- Complex interfaces to mainframe legacy applications

Obtaining a Short List

The approach taken by the vendor requirements subgroup was to select EDMS solutions to review based on the research of Doculabs, an independent system evaluation and consulting firm, known for its detailed consumer reports-like methodology. Reviews of Doculabs research yielded a number of viable vendors and products in the document management and imaging

marketplace. The sub-group began with a short list of vendors identified by Doculabs, provided each vendor with information about the pilot project that was envisioned and asked for presentations and demonstrations. In many cases, vendor presentations were not complete and questions remained unanswered. In such cases, vendors were invited to make follow-up presentations to the sub-group. As the field of viable vendors was slowly narrowed, several were asked to respond to specific questionnaires related to their products' workflow and records management capabilities.

In addition to the research of the Working Group, separate consultations were held with the Gartner Group and Doculabs. These consultations were valuable resources to the committee and allowed members to obtain information and insights into vendors and products that were not available elsewhere.

Throughout this process, the vendor review sub-group sought to gain an understanding of the capabilities of each vendor's document management system and to disseminate information within Miami-Dade County departments about the capabilities and benefits of such systems. As the sub-group learned more about integrated document management systems, a picture of the ideal system evolved. For Miami-Dade County, the ideal system would have the following characteristics:

- A vendor expected to survive the predicted consolidation of the EDMS marketplace would offer the system. The vendor does not have to be the biggest, in terms of sales or revenue, but it has to be on a list of survivors published by a reputable research firm such as the Gartner Group or Doculabs
- The system must be highly integrated. The various functional components required, e.g. imaging, workflow, document management, COLD, and records management, should be provided by a single vendor and designed to work together as seamlessly as possible
- The system must provide significant out-of-the-box functionality. Many departments do not have the internal resources to fund significant expenditures for integration services. Thus, products that can be implemented and configured easily and provide complex functionality without substantial custom programming are preferred
- The system must manage the life cycle of the document or object
- The system must provide a high degree of security and be able to restrict access to objects and annotation layers applied to those objects
- The system must provide a feature-rich web/browser interface with no plug-in or a small footprint plug-in
- The system must be scaleable, which means that the system must continue to function well as it is expanded from meeting the needs of a few departments to meeting the needs of the enterprise

- The system must be able to support simple administrative document management as well as robust, production-level imaging with high volumes of document and transaction throughput
- The system must have a flexible programming interface; a tool set to enable the development of complex custom-built applications, and an ability to manage electronic forms

In addition, EDMS products should meet the technical requirements identified in the appendix.

Purpose of the EDMS Working Group

The specific responsibilities of the EDMS Working Group are:

- To provide input and assist in developing the vision for the deployment of technology to meet the future imaging, electronic document management and workflow requirements of the county
- To review available EDMS software and recommend alternatives to the CIO
- To coordinate the implementation of a pilot project to assess EDMS software capabilities
- To serve as an information clearinghouse regarding imaging, electronic document management, and workflow technology
- To provide a countywide forum for the discussion of functional and technical issues related to the implementation of EDMS technology
- To review imaging, electronic document management, records management, and workflow standards and procedures
- To recommend organizational structures/processes that will facilitate the introduction of EDMS into Miami-Dade County

Background

What is EDMS?

An Electronic Document Management System/Imaging (EDMS) system is a set of computer-based technologies used to capture, process, index, store, access, view, revise, reproduce, distribute, and dispose of information. Traditionally, imaging systems have been designed to capture images of paper documents. Document management systems, on the other hand, are designed to not only work with scanned images of paper documents, but also with electronic documents as well as output from mainframe computers, and even e-mail.

Electronic documents are best described as electronic information objects, which can be:

- Word processing files
- Spreadsheets
- Computer Aided Drafting (CAD) drawings
- Computer Output to Laser Disk (COLD) files
- Scanned or faxed images
- Microfiche and microfilm
- Sound files
- Video clips
- Database information
- A sequence of events – workflow

Document management systems employ a number of separate technologies, each of which were developed specifically to manage information. These include:

- Document capture tools such as scanning, optical character recognition (OCR), electronic data interchange (EDI), electronic forms, and bar coding
- Workflow management which is used to automate the flow of business processes or tasks, and not only pushes paper through a process, but is also a good notification tool as to what needs to happen next
- Archival and document management tools, which support organized electronic storage, indexing, version control, archiving, search, retrieval, and distribution of documents.

Characteristics that help define EDMS are:

- How documents or information is captured
- How the information is processed
- How the information is indexed and accessed

How can EDMS work in County government?

Although when we think of documents we think of paper, there are many other types of documents including electronic mail, computer files, microfilm, microfiche, sound and video recordings that can be managed. The problem is not with a particular media (such as paper) but

with how we organize to process and provide access to information to members of our own departments, other county departments, and the public.

EDMS should be implemented in a department if:

- There are volumes of incoming correspondence to process and file
- The department uses many different types of forms
- There is a need to provide immediate access to information to multiple users
- There is information from paper or reports to post into computer files
- There are notices and/or correspondence to file and track
- There are file folders stuffed with paper, photos, CAD drawings and copies
- There is a requirement to provide documents to other departments, and to members of the public
- There is a large volume of correspondence via mail, email, fax, and interoffice mail
- There is a need for efficiency by introducing automated workflow to the business process
- There is need for better security and back up of important documents
- There is a need to reduce the amount of floor space dedicated to paper files
- There is a desire to improve service to the public

What is the vision of EDMS in Miami-Dade County?

The vision is to use IT to improve county processes -- streamline business processes, reduce paperwork, speed decisions, improve services, and reduce the overall cost of government. Studies have shown that EDMS increases productivity through automated workflow, provides immediate access to critical data, reduces storage space and associated costs, and provides increased security for critical documents.

What is the importance of workflow?

Workflow can be thought of as the “movement of documents and tasks through a business process.”³ While this is a simple concept, the importance of workflow to improved productivity cannot be overemphasized. The implementation of workflow forces organizations to reexamine their business processes, and should be the primary reason EDMS is implemented. According to Kobielus,⁴ when workflow is implemented, there are three major objectives that should be addressed: 1) to minimize process time; 2) to improve the quality of a product or service, or reduce its price; and 3) to maximize flexibility at the initial point of contact.

For example, to minimize process time, workflow systems allow organizations to reduce the number of participants in a process and reduce the maximum completion time of each task. This is accomplished by automating tasks and by notifying staff of approaching due dates. In addition, such systems can reduce the time to transfer work between tasks, ensure that high-priority tasks are addressed first, and increase the number of tasks running in parallel. In the SPIRIT Traffic Court system, processes that took hours to perform when paper was being moved have been reduced to minutes through the implementation of workflow.

³ An Introduction to Workflow Management Systems. Center for Technology in Government University at Albany—SUNY State Archives and Records Administration. November 1997.

⁴ James G. Kobielus, Workflow Strategies, IDG books Worldwide, Inc., 1997, page 39.

Improvements in the quality of a product can be achieved by applying standard workflow routes, roles, and rules automatically to each new case and by providing workers with immediate, on-line access to all information to enable continual tracking and notification. Moreover, costs associated with paper documentation can be reduced because paper is scanned and indexed as soon as it enters the workflow. Another benefit of removing paper is the improvement in the quality of the working environment.

Access to files at multiple locations and by multiple workers maximizes flexibility and more fully addresses customer needs. Data is usually captured only once, and workers can tailor processes to the customer's needs.

Thus, it is critical that as EDMS systems are implemented, departments look for opportunities to change processes. Without the business process reengineering that implementing workflow requires, document management and imaging systems will not reach their full potential.

Electronic Forms

Electronic forms provide a convenient way to enter the world of workflow, and they have significant potential for improving business processes. Forms are already familiar to county employees. Electronic versions should not be difficult to use. They are beneficial in that forms can be used at the initial point of contact with an employee or citizen, the data can be captured once and not re-keyed, they can be tied to legacy information systems, and the submission of the form can initiate a workflow process.

EDMS Architecture Issues⁵

The EDMS architecture issues discussed below relate to the hardware platform and the applications development environment.

Hardware Platform

In the area of desktop platforms, the county has a major investment in Windows and Intel-based computers. Based on the review of the EDMS system alternatives, there is no need to consider any other platform. The primary decisions many departments will face will more than likely be related to thin or thick hardware clients. In some cases, it will make sense to rollout network computers with limited disk capacity. In other cases, extremely robust workstations will be the norm.

In a large and highly distributed environment, the EDMS should ideally provide thin-client browser-based interfaces, or messaging-based interfaces that can easily be made available to all potential users. These types of clients require far less administration, maintenance and support, making them much more practical than thick-client systems.

Finally, it makes sense for Miami-Dade County to look for EDMS technology that allows the integration of the client software or interface with productivity tools. Miami-Dade County's users work with a variety of applications each day, including word processors, spreadsheet programs, CAD systems, e-mail systems, accounting systems, and mainframe systems.

Ideally, the EDMS should be integrated with these productivity tools and systems, enabling documents to be seamlessly captured and stored. For example, e-mail messages associated with a specific project or task should be stored in the central repository with other electronic documents corresponding to the same project or task. For Miami-Dade County, this requires the ability to integrate the EDMS with Microsoft Exchange to capture relevant messages. This integration may require various levels of custom programming, whether by Miami-Dade County or by the integrators that deploy the system.

With respect to servers, there are some differences in vendor offerings. Some vendors only support the NT environment, others support NT and multiple flavors of Unix running on HP, Sun or IBM hardware, and most vendors that support both, can easily include both NT and Unix servers in the same system. Each of these operating systems has a foothold in Miami-Dade County (with IBM AIX being the most prominent Unix version supported) and the county should be able to select a platform that best meets the needs of the application. Any decision regarding NT or AIX UNIX, however, must be matched with the capabilities of the EDMS solution selected for implementation.

Naturally, network infrastructures are of critical importance in the overall performance and reliability of imaging and document management systems. Certainly, LANs should not be slower than 10 MBPS, with the recommendation being 100 MBPS. The county's WAN,

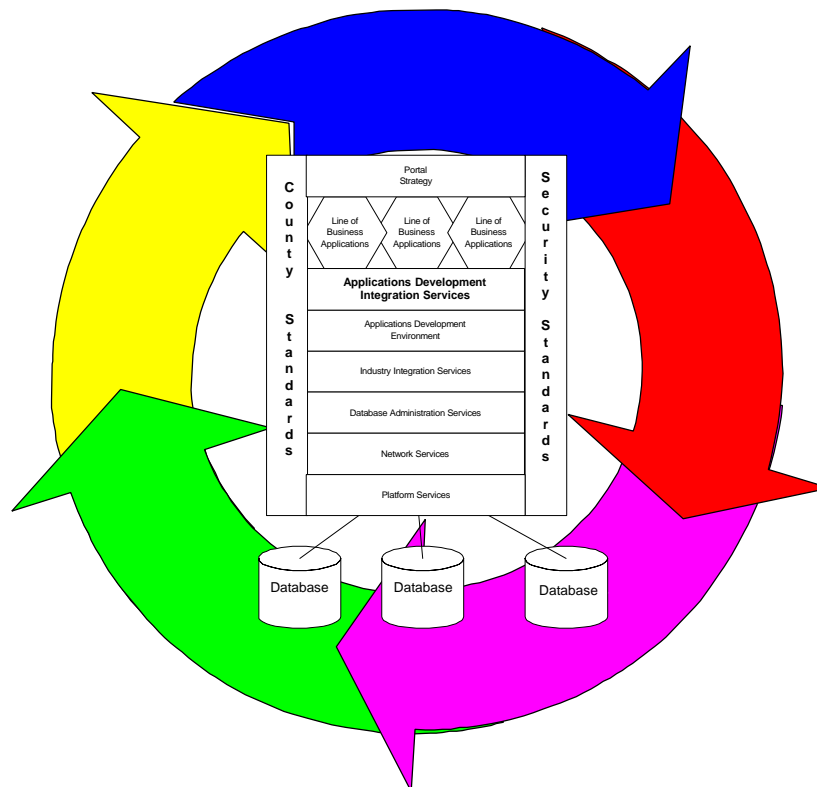
⁵ Doculabs as a follow-up to their consulting engagement with Miami-Dade County provided most of the material contained in this section.

Metronet, supports the higher speed, and efforts are underway to explore much higher speeds. As EDMS systems are implemented countywide, there will, no doubt, be extraordinary pressures placed on the available bandwidth. As more Internet and Intranet access is provided to such systems, the network and web server infrastructures will have greater and greater demands placed on them. It will be imperative to continually monitor and enhance the county's network capabilities.

Applications Development Architecture

EDMS systems today offer a staggering variety of integrated services, including COLD, workflow, e-forms, imaging, search engines, records management, document archival and retrieval, FAX, and document management. A critical component is the application development toolkit that is provided. EDMS will serve as the foundation for future applications-development efforts. EDMS include sophisticated middleware that provides linkages between line-of-business applications and the EDMS or web-based systems. EDMS core technologies are enterprise-deployable services that should be exploited by end-user applications that compliment or augment traditional application development efforts. It is a well-documented fact that incorporating e-forms and workflow provides significant efficiencies and concomitant cost savings for deploying entities. Developers can use middleware utilities to build new types of applications. It is apparent that EDMS systems provide capabilities that will be pervasive in future line-of-business applications. This became clear during the committee's product review, when Microsoft announced it was incorporating features of EDMS into its new Windows operating system. Because of such announcements, EDMS architectures and capabilities will exist in virtually every enterprise by default.

Miami-Dade County's Systems Development Architecture



Initial Pilot Project

A limited-scope pilot project has been identified for implementation to determine: 1) whether the system is effective in meeting its goals; 2) whether the product is appropriate; and, 3) what changes are required before moving into full-scale development. This project, which will involve implementations in three areas with somewhat differing needs, will be useful as a proof of concept, and demonstrate that EDMS will be beneficial to the county.

The pilot project has several essential goals:

- Convert written requirements into a physical system with which users can interact
- Ensure that requirements are thorough and accurate
- Ensure that the system adequately addresses user requirements
- Identify and document any missing capabilities/features
- Establish a common understanding among members of the team
- Allow for initial testing of the recommended product
- Evaluate the capabilities, strengths and weaknesses of the vendor's professional services and support

The pilot project will involve the following three initiatives:

Employee Relations Department

The Employee Relations Department plans to install an imaging system to manage employee personnel files. Their requirements include, but are not limited to: scanning employee folders in the file room, making redacted copies of personnel files available to authorized third parties, developing a prototype forms application in which electronic forms are completed in departments and routed to their various destinations by an automated workflow, and COLD. Once scanned and indexed, employee files will be available to all participating departments. This project is a good example of a horizontal application that impacts all county departments.

Department of Environmental Resources Management

DERM is focusing on a document management system to meet the needs of the proposed county plan review process. This project will benefit multiple county departments, such as Water and Sewer, Building, and Planning and Zoning, etc., which need ready access to plans submitted for review. The essential elements of this project include the ability to effectively manage Computer Aided Design (CAD) drawings through a workflow within and between county departments that need to review, annotate and approve plans. An additional requirement would be to publish annotated plans on the Internet for submitting clients to review and check status. DERM, like many county departments, has a traditional file room, which will be incorporated into the pilot to evaluate the effectiveness of the scanning, quality assurance, indexing and data entry capabilities of the solution.

Permit System

This facet of the pilot project consists of three phases. Phase I includes the development of an E-Commerce function that allows applicants to pay permit fees using credit cards via the Internet.

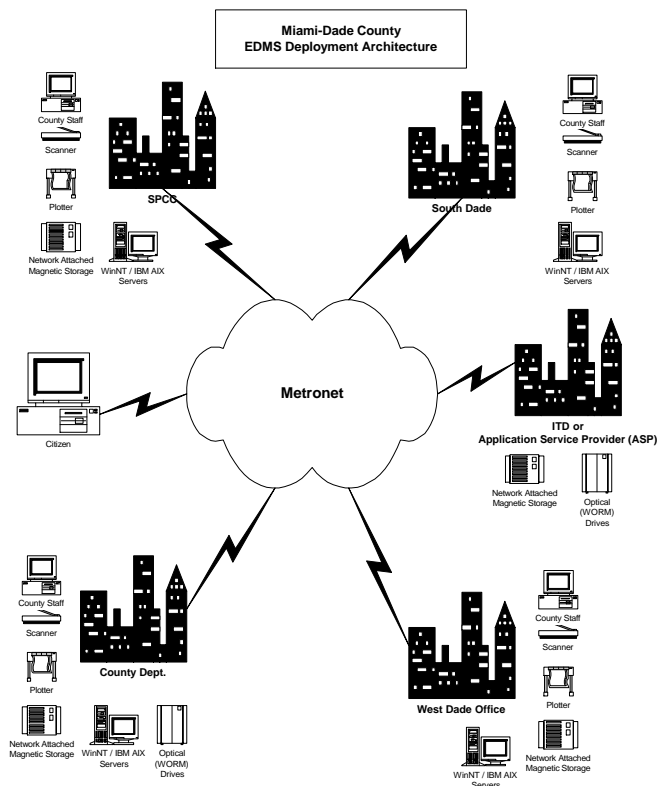
The E-Commerce function will be used in all phases of this project. In addition, Phase I includes the issuance of digital certificates allowing applicants to digitally sign and/or seal the permit application.

Phase II includes permit applications for subsidiary and standalone permits that do not require plan review. This phase will address the submission of permit applications for electrical, mechanical, plumbing and gas permit types.

Phase III will introduce the acceptance of building application roofing permits (subsidiary and standalone). Roofing permits require the applicant to submit a plan. The plan must be stored in the form of an image in the database. This phase will include the electronic revision of plans, workflow collaboration between the Building Department and DERM in the review of plans, and Internet mail communications between the applicant and plan reviewers based on workflow events.

Enterprise Deployment Strategies⁶

The deployment strategy for the identified pilot project will be quite simple, but should test the basics of an enterprise-wide solution. To fully deploy this technology at an enterprise level, however, will require significant investment in planning, infrastructure, and new equipment. The deployment strategy presented here is a model that leverages the county's computing resources and is flexible depending on user requirements and service level agreements. Performance is critical, and to build a high-performance, enterprise-scalable system, bandwidth, magnetic and optical storage, appropriately distributed servers, and reliable cabling will be needed.



This enterprise deployment strategy is based on the assumption that sites are wired to Metronet and have the basic connectivity (PC, Email, Internet) requirements as well as the basic peripherals (scanners, plotters, fax, etc.). The deployment strategy could be characterized as follows:

- Large multiple department sites such as the Stephen P. Clark Center (SPCC) in which ITD would be providing the core services for several departments might require local EDMS servers (IBM AIX or WinNT) and local magnetic storage (network attached disk) to provide the local power necessary to perform adequately

⁶ Doculabs as a follow-up to its consulting engagement with Miami-Dade County provided some of the material in this section.

- Small multiple department sites such as the South Dade Government Center might have less processing requirements and might not need any local computing services
- The new West Dade Office for permitting will have high processing and performance requirements due to large file formats (AutoCad) and extensive workflow processes. A site such as this will require a complete installation with local servers and magnetic storage (network attached storage)
- A power user department which intends to use this technology as a foundation for building sophisticated line-of-business applications, as well as one with strict security requirements, may need its own EDMS servers, local magnetic storage, and possibly optical storage
- ITD's Regional Data Processing Communications Center (RDPCC) would provide an excellent site to house the electronic records management, library services, and disaster recovery necessary for enterprise level deployment. Each distributed site would replicate the day's activities to ITD's site where the county records would be stored on optical or tape storage. Depending on resolution of legal issues there might be the possibility to leverage existing tape silos at ITD.

This is not intended to be a static model, but a work in progress as requirements are defined and technology improves. The selected product and its capabilities will play an essential role in the deployment strategy. During the first one or two years of deployment, the county will face a significant learning curve.

Repository Considerations

Miami-Dade County should employ distributed object servers (repositories) that are available throughout the enterprise, as opposed to deploying dedicated (and potentially isolated) local repositories at the departmental level.

The county's distributed repositories should be centrally managed, making them the main logical storage area for all information to which users have access. The central repository should be used to store data from all departments, as well as to provide a common repository for documents that must be shared

Data should be uploaded to the central repositories in batch mode in off-hours, which will shift the network traffic burden from business hours. With this approach, remote users will be able to transparently access the central repositories for:

- Historic data that does not exist on their local server after the peak retrieval period
- Data from other departmental repositories
- Backup data in case of emergency or local server failure

For locations in which users do not need sub-second access to information for other departments, this approach is viable, because image movement is done in the local area network, and not across a limited bandwidth connection. As for local users, since all the images they need reside on their local servers, the upload process should have minimal effect on their daily activities.

In addition to the technical concerns mentioned, system maintenance will be a top concern. The systems must be maintained for peak performance at the local level. In addition, managing users in a distributed system can be challenging. Each department will require a local system manager to keep track of user permissions and update the central administrator on user access requirements.

Network Design and Management Considerations

An enterprise EDMS will have significant implications for Miami-Dade County's networks, as users will be storing, transferring, sharing, and routing more information than ever before. Additionally, as Miami-Dade County moves toward electronic exchange of information with production workflow applications, network demands will further increase.

Network traffic is a critical issue. The design of Miami-Dade County's networks (both LAN and WAN) must be able to support the EDMS with acceptable performance, without causing detrimental impact on the other various mission-critical applications that share the network's resources. In general, document and image retrieval and viewing over a local area network (LAN) ranges between three and ten seconds. Additionally, as documents or images are shared among remote locations, network traffic becomes even more problematic. In the worst case, direct document access over a WAN can take as long as 2 to 5 minutes, depending on network traffic and optical jukebox performance.

One capability that can be leveraged to address network issues and response times is replication. For example, replicating entire repositories to servers in remote sites or geographically dispersed locations will reduce demands that would normally be placed on a WAN to access those documents from remote sites. This approach makes sense in situations where there is little or no ability to predict retrieval patterns, and immediate response time must be guaranteed. However, the replication process is resource-intensive and should be scheduled for off-hours, and it requires additional hardware and storage at remote locations.

It is also critical to leverage technologies for network management and monitoring of network activity. Miami-Dade County can utilize technologies to help manage both the LANs and WANs, and to maintain optimal response times at remote locations. Desired capabilities include:

- Tools for modeling and monitoring network traffic
- Programmable transmission methods such as support for Remote Procedure Calls (RPC) between clients and server, so that network traffic can be prioritized
- Capability to schedule the migration or movement of documents and images in batches during inactive periods
- Failure notification
- Distributed database management tools

Storage Management Considerations

Storage technology, like bandwidth and network infrastructure, is critical to the overall performance of an EDMS system. Regardless of the bandwidth and network resources available,

inadequate storage devices can cause performance degradation. Storage strategies will vary based on the capacity, retrieval performance, and accessibility required by the given application.

For example, small departments of local users making only occasional retrievals can probably live with slower retrieval times, and may not need access to large repositories of historical documents. Larger groups with many local and remote users making frequent retrievals will have more demanding performance and availability requirements. Finally, some applications may need to archive larger volumes of documents for longer retention periods, based on regulations or best practices.

General guidelines and suggestions that can help Miami-Dade County implement the proper back-end storage strategy include:

- Determine data storage requirements for today and the future – and understand that as Miami-Dade County moves more toward a “paperless” office, the storage requirements will increase significantly
- Determine the appropriate retention schedules for the information in order to meet practical, regulatory, industry, and legal requirements
- Assess usage patterns to determine how many users are likely to need access to the system at a given time
- Understand the varying complexities involved in implementing and maintaining different storage technologies, and determine the resources available to administer the storage systems
- Understand the trade-offs of different electronic storage media types – for example, CD-R is inexpensive but does not necessarily meet strict retention rules, while Write Once Read Many media is more expensive but meets legal requirements for data that cannot be altered
- Consider storage technologies that provide features to improve performance, such as retrieval queue management, request prioritization, and sophisticated caching
- Consider hierarchical storage management (HSM) technology to intelligently migrate data across media types as retrieval frequency and performance requirements change (the same HSM may be able to handle multiple DM, imaging, and workflow systems).

Storage Device Options

There are three primary classes of storage technology: on-line storage, near-line storage, and off-line storage. Magnetic storage such as a hard disk and RAID (redundant array of independent disks) is typically referred to as **on-line storage**. This approach is best for data that are frequently accessed and requires fast response, often referred to as “real-time.” For example, the networked drives which users access frequently often use RAID to provide fast performance. Although the price of magnetic storage is dropping, it is still more expensive than near-line or off-line storage, and may not be justifiable for data that is rarely accessed.

RAID or mirrored storage should be used as primary storage for the local servers. As for the central repository, magnetic should act as the staging area for downloading batches of data from the distributed locations, as well as a caching area for retrievals.

Near-line storage technologies, also referred to as “secondary” storage, can be utilized for large volumes of information that are accessed less frequently and for which retrieval performance is less of an issue. In recent years, the performance of optical devices and drive speeds has increased, as has the capacity of various optical media types. For extremely large data stores, jukeboxes can be used as a way to provide access that is far more cost-effective than RAID. Storage devices such as CD, DVD, or optical jukeboxes are considered near-line storage technologies. Optical storage provides a way to store documents for extended periods to meet legal requirements. To improve performance, it makes sense to also use configurable caching options, if available, and to use on-line storage devices such as RAID in addition to server hard drives to act as the staging area.

Off-line storage can be utilized for information that must be retained for legal reasons, but is unlikely to ever be accessed. This type of information can be stored on off-line tape, off-line optical media, microfilm or microfiche, or even on paper. For the initial implementation phases, the original documents can serve as the off-line storage medium as well as the ultimate backup for the new system. Thus, even if the new system experiences problems, normal business can proceed as usual. This strategy should continue for at least a year after the complete EDMS rollout.

Policy Guidelines

Disclaimer: There are many policy guidelines and standards that should be reviewed and adopted based on the technological and organizational requirements of Miami-Dade County. This section is not intended to be a comprehensive listing of all such policy guidelines and standards. Rather, it represents a limited set that must be updated and expanded significantly before it will be complete.

Security

Whatever solution is used to provide public access to objects and records while preserving privacy must maintain the integrity of the record as well as ensure that material exempted from disclosure is not accidentally made available to the public. A department security strategy must include (at a minimum) the following:

- Control of data and information resources (including access and handling of sensitive information, audit trails, and incident reporting)
- Physical security and access to data processing facilities (including environmental controls, fire and water damage prevention and protection)
- Logical and data access controls (including personal identification and access, password controls, access to software and data, security of the application, data and file encryption, and network encryption)
- Network security (including security at network entry and host entry, dial-up access)
- Backup and recovery (including contingency planning)
- Security awareness
- User lists and access privileges that are internally reviewed regularly
- Passwords that are changed regularly
- EDMS must include access restrictions to prevent the retrieval of data or index information by unauthorized personnel. Further, any EDMS must provide audit trails

Data Entry

Regardless of the data entry method or subsystem chosen (document imaging, COLD, video, text, etc.), index entry verification must be performed to ensure the accuracy of index information and to prevent rendering a record 'lost' due to incorrect data entry.

Image Compression-Decompression

Document imaging systems must support the CCITT standards with no proprietary alterations to the algorithm. Software used for compression and decompression must be 100% compatible in all clients and servers on the network. All records must be compressed when being transmitted on the county's network.

Scanning

Document scanners must comply with TWAIN⁷ standards and provide a scanning density of at least 200 dots per inch (dpi) for office documents, and 300 dpi for archived historical records and “engineering drawings, maps and other documents with background detail.”⁸

User Interface

End user interface must support the environments listed below.

- Windows 95 /Windows NT/Windows 2000
- Industry Standard Internet Browsers

Communication

If network communication is required, the imaging system must utilize TCP/IP, and utilize the countywide area network and installed Local Area Network (LAN). The system must be able to distribute images in one of the following: formats, at the option of the sender:

- CCITT Group 3 or Group 4 FAX
- JPEG
- Bit-mapped
- PDF

Annotation

A document imaging system must support the ability to annotate an image without physically modifying the image. The EDMS must provide annotation security and multiple layers of annotations.

Image File Format

The system must use non-proprietary file header formats to label digital images. The CCITT group has developed a TIFF file header standard. Both CCITT Group 3 and 4 FAX formats are acceptable.

Indexing

Indexing (adding properties to information objects) must be done using an American National Standards Institute (ANSI) Standard Query Language (SQL) Database Management System (DBMS) that can reside remote from the storage location. The index must be accessible and able to be modified through user-written standard application development languages, subject to the appropriate security considerations.

Media

Optical media must support either Group 3 or Group 4 compression techniques. In addition, optical disks will be obtained only from vendors who guarantee a minimum of 10 years of reliable use.⁹

⁷ The TWAIN Working Group is a not-for-profit organization that represents the imaging industry. TWAIN's purpose is to provide and foster a universal public standard that links applications and image acquisition devices.

⁸ Chapter 1B-26, Florida Administrative Code. Records management – standards and requirements. Electronic recordkeeping.

⁹ Ibid.

Networking

If network communications are required, the EDMS must operate in an environment supporting the county's LAN and WAN standards as defined by ITD – i.e., TCP/IP, Token-Ring and Ethernet, Frame Relay.

Service Bureau/Backfile Conversion

Work done by a service bureau or contracted to a conversion service or input preparation service must conform to the policies outlined herein.

Issues and Conclusions

The EDMS Working Group has identified the following issues that must be resolved before the county can begin to take advantage of the benefits of document management and imaging systems. The issues include, but are not limited to:

- Budget Planning for EDMS
- County Core Competency Issues
- Business Process Redesign/Implementation Support
- Network Infrastructure
- Legacy System Database Access Standards/Methodologies
- Application Service Providers
- Facility Management
- Outsourcing
- Records Management

Budget Planning for EDMS

Potential Costs

System pricing can be quite variable in the EDMS market. Miami-Dade County can expect to spend money on more than just software costs. Other costs will include support and maintenance, hardware, integration, development, and training.

In order to help Miami-Dade County more accurately estimate the costs associated with the EDMS, Doculabs has provided information that 1) presents a methodology used by integrators and vendors for developing cost estimates, and 2) identifies some of the typical risks that integrators will weight when creating a cost estimate.

Methodology for Estimating Costs

Cost estimates from a vendor or integrator typically include components for a wide variety of goods and services, such as:

- *Software* - can be priced per seat, per connection, per processor, per server, per volumes, or any combination
- *Professional services* - based upon the level of effort required to complete the activities to be performed and the hourly billing rates of the project specialists delivering the services (including migration and conversion)
- *System hardware* - based on the hardware needed to support the EDMS deployment as specified, such as servers, scanners, storage devices, etc.
- *System software and third-party systems* - based on any additional software needed to support the EDMS deployment as specified, such as databases, capture systems, etc.
- *Maintenance and support* - usually priced in the form of an annual maintenance, upgrade, and support contract
- *Training* - based on specific training the vendor estimates will be required by administrators and users

Most vendors and integrators have formulas or guidelines for the percentage that each component contributes to the total cost.

Typical Risk Assessment Factors

For a project estimate, the integrator typically varies the estimated costs based on a number of risk assessment factors, such as:

- The overall size and scope of the project
- Relative skill level of the customer's project team as well as the professional services personnel
- The number of functional groups within the organizations that are likely to be involved in the project
- Uniqueness of the application to be developed
- Exceptional constraints such as "tight" deadlines and due dates
- Relative stability of the business and systems environments

It is recommended that the Chief Information Officer negotiate an enterprise licensing agreement with an EDMS vendor. This would enable county departments to install software on any number of servers and client systems and to support public access without licensing constraints.

Core Competencies

Implementing EDMS and imaging systems can be a complex task requiring skill sets not readily available among Miami-Dade County employees. Two fundamental questions must be addressed. Does management seek to make all aspects of the design, development, implementation and support of EDMS and imaging systems a core competency of the county? Alternatively, does the county intend to use the services of other third parties to perform some or all of these functions? The county has several hundred trained IT resources and at least 800 developers. Although client server technology may not be a core competency for many of them, there is sufficient talent to retain this technology as a core competency.

If the Clerk of Courts SPIRIT project is representative of the county's philosophy in this regard, the county clearly seeks to make support of departmental imaging systems a core competency. This, however, does not mean that a core competency currently exists within the county to support SPIRIT, nor that the transitions from non-county resources will be easy or successful. The SPIRIT experience is worthy of a closer examination in order to fully assess the challenges that lie ahead if the county chooses to build a capability to support EDMS and imaging systems in the future.

The Clerk of Courts contracted with Andersen Consulting to develop SPIRIT (a comprehensive traffic court imaging system) approximately five years ago. While the system has been in production for over two years, the county has managed to put in place a competency to support only certain components of the system, i.e., the wide area network, local area network, hardware and commercially available software such as FileNET, Oracle, and AIX. Currently, the county is not capable of supporting the SPIRIT application programs without the assistance of Andersen

Consulting. It is anticipated that another year of intensive training and experience will be required before the transition from external to internal support can be accomplished.

A major reason why the transition to county support has taken so long to complete is that ITD has limited experience with client/server systems. The skill sets required developing, maintaining and enhancing mainframe applications are not the same as those required to develop applications on personal computers and UNIX servers using Visual Basic and C together with software products such as FileNET.

SPIRIT addresses only one area of the court, Traffic Court, and involves relatively few new technologies. The issues encountered in the SPIRIT project will be more apparent as the county implements enterprise-wide document management, workflow and electronic records management, not to mention e-commerce, web-publishing, call center, data warehousing and corporate portals. It is difficult to recruit and retain people with experience developing web-based systems. Recruiting “e-savvy” talent is not a local problem, but a global problem. According to a recent industry survey, 66% of the 300 multinational corporations surveyed “are struggling to lure the best people to capitalize on e-commerce initiatives.”¹⁰ Is it not reasonable to assume that Miami-Dade County would have similar problems?

The decision outlined previously regarding how the county intends to support EDMS and imaging systems (as well as e-commerce systems) must be addressed. Should the county desire to make support for EDMS a core competency, it must be willing to:

- Develop a comprehensive plan clearly specifying which skill sets must be developed within the county and which will be purchased from integrators or consultants
- Dedicate the funding required to hire and/or train staff in the required technologies and methodologies in a timely manner well in advance of implementations
- Identify the affected agencies, as well as their management and technical support responsibility for developing and putting in place such expertise
- Begin immediately to develop the required in-house capabilities

If the county waits until systems are acquired and/or built and implemented by integrators to begin the process of building core competencies, it will be too late to insure a smooth transition to county support.

Business Process Redesign/Implementation Support

Some county departments that could benefit from a document management or imaging system have limited or non-existent in-house technical expertise to assist in such critical areas as cost/benefit analysis, requirements analysis, business process redesign, and system implementation. Moreover, some county departments may not realize the importance of EDMS and how it could benefit their business processes. The EDMS Working Group envisions a situation where many departments have identified basic needs, but have no capacity to select software components, contract with an integrator, and manage (or at least monitor) the system design, development and implementation of a system. Fundamentally, the county needs to

¹⁰ Towers Perrin, as reported in Contract Professional, Volume 4, No. 10, June 2000.

identify individuals with skills in the identified areas whose mission is to facilitate the introduction of EDMS technology into the workplace.

Network Infrastructure

Some county departments may require significant upgrades to their network infrastructure (routers, hubs, switches, and desktop computers) in order to be in a position to effectively implement EDMS systems. In addition, steps must be taken to insure the county network infrastructure is capable of supporting an enterprise-wide implementation of EMDS/I technologies.

Legacy System Database Access

Currently, there are two principle methods for accessing data stored in legacy database systems: screen scraping and direct database access via ODBC. Screen scraping is commonly used when mainframe applications provide a robust front-end for a master database and the development cost and time prohibit duplicating complex data editing functionality in the client or middle tier system. While many integrity problems can be mitigated by clever table-driven designs, the screen scraping method is slow and vulnerable to unannounced changes in mainframe screen maps. It is the understanding of the Working Group that ITD's support for direct database access methods is limited at this time. However, distributed and web-based systems are being developed that require efficient access to mainframe data, and it is incumbent upon ITD management to develop data access capabilities. In addition, it will be necessary for ITD to provide methods and tools that take full advantage of today's technology to facilitate tight integration between client applications and legacy databases. Caution should be exercised in that should ODBC database updates be allowed, editing code must be maintained in parallel to the legacy application.

Application Service Providers

The belief that an organization can benefit by outsourcing operations that are not core competencies is not new. In the past, however, the focus has been on infrastructure components that the organization couldn't or didn't want to support. The rise of the Application Service Provider (ASP) marketplace has organizations thinking about not only outsourcing infrastructure components (e.g. wide area networks), but also about essentially renting applications. In addition, according to Doculabs¹¹, organizations are now willing to rent strategic applications such as e-commerce, or document management. The Working Group examined this opportunity as well, but the market is not mature enough at this time. This may be an opportunity for future considerations especially if the county desires not to support the infrastructure needs of the technology deployed.

What does this mean for Miami-Dade County? Theoretically, it could mean "fast implementation, flexible pricing, and the ability to change business focus and strategies with less worries about IT impact."¹² However, issues like security and mission critical applications will cause Miami-Dade County to take a cautious approach with ASPs. There are, however, a

¹¹ EDMS for Rent. James K. Watson, Jr. and Richard Medina. Doculabs. Published in *Imaging & Document Solutions*, December 1999.

¹² Ibid, page 3.

number of EDMS vendors, including Documentum and FileNET, whose offerings can be rented from ASPs.

The EDMS Working Group has not yet had an opportunity to fully explore the possibilities of ASPs. However, depending on the county's strategic direction and the ultimate resolution of the issues such as core competencies, it would be wise to evaluate ASP offerings in the area of document management, records management, data warehousing, e-commerce and call center.

Facility Management

The implementation of EDMS and imaging systems will require the installation and operation of workgroup servers (NT or UNIX or both), optical storage devices, network storage systems, and local area networks. Many county departments are ill equipped to setup, configure and manage such complex hardware and software systems. There is a clear need for some level of facility management services. Such services do not necessarily have to be provided by the county. Many facility management services could be classified as infrastructure and it may be advantageous to outsource such services. While many departments depend on ITD for such services, ITD does not now provide day-to-day management of departmental servers. Rather, they support the WAN, usually to a router demarcation point, and infrastructure servers such as countywide email servers, Internet servers, and the like.

Outsourcing

As mentioned previously, it is common for organizations to outsource infrastructure support that is not considered a core competency and to hold on to more strategic functions. Thus, in many cases it might make sense to outsource a web hosting service, but provide support for custom application development for the county's core business needs. In the area of EDMS, scanning, backfile conversion, micrographics, document storage and records management are services that historically have been outsourced. It is recommended that the county explore alternatives for outsourcing, especially for services/functions that are short lived or that require specialized skills.

In the view of the EDMS Working Group, the most appropriate system components to outsource now include file room scanning, disaster recovery, and optical storage. This might not be the case for selected departments with high security needs such as Police. ITD has the facilities to manage such system components; but county policy may elect to take alternative approaches. Should ITD decide, for example, that it would not operate a document/image storage site; there are many firms that could provide this service.

Of particular concern is the volume of paper documents that departments want to scan into an EDMS. The number of documents is staggering. The county would be wise to outsource backfile scanning services, rather than establishing its own capabilities or distributing this burden among the various departments.

Records Management Specifications

The importance of records management cannot be overstated. The EDMS Working Group has assumed that any enterprise document management system be capable of managing the document life cycle as defined by the Office of Records Management. To further elaborate on the specific

needs in this area, the Office of Records Management has provided functional specifications (in the form of a checklist) that should be incorporated into any EDMS implemented in Miami-Dade County. The checklist is shown in the appendix.

Recommendations

Implement an integrated EDMS

EDMS integrated solutions provide imaging, document management, workflow and computer output to laser disk (COLD) in a single system. By implementing an EDMS integrated solution, Miami-Dade County can expect to obtain the following benefits:¹³

- Simplifies maintenance for administrators and IT staff
- Reduces the cost of training and eliminates the need for users to know or care where documents reside
- Offers a better chance for acceptance across a wide-range of departments
- Results in potentially fewer problems with software upgrades than might otherwise be encountered in systems that use products from multiple vendors
- Reduces integration efforts that would otherwise be required with “best-of-breed” systems
- Simplifies integration with critical systems

Engage Identitech for pilot

Based on its research, the Working Group recommends a pilot project be implemented using the FYI software from Identitech. Identitech’s FYI tightly integrates the major functions of interest to Miami-Dade County departments, namely, imaging, workflow, document management, records management, and COLD, and provides significant out-of-the-box functionality. In addition, much of FYI’s functionality can be extended to web users with a native browser (Netscape or Microsoft) without a “plug-in.” Other reasons for selecting Identitech include:

- Identitech is not the largest EDMS vendor, yet the Gartner Group indicated there was a probability of .7 that Identitech would challenge for a leadership role
- FYI is a truly integrated system that includes imaging, document management, COLD, and records management. Other software evaluated required the use of third party products for records management, redaction, and the management and annotation of CAD drawing files
- While FYI began life as a sophisticated tool kit, Identitech has built significant out-of-the-box functionality into the system by adding Visual Basic application programs to manipulate the controls provided by the toolkit
- FYI is installed in a variety of settings and has been demonstrated to be highly scaleable and robust. In addition, the system must support administrative document management as well as robust, production-level imaging with high volumes of document and transaction throughput

¹³ Special Report on EDMS Integrated Solutions. Doculabs, First Edition (1.1), 1999.

- FYI provides extensive content management and search capabilities through integration with the Excalibur search engine
- Comprehensive and powerful security features. FYI administrators can control user access at the object and metadata field levels. Complete audit trail and security reports are built in
- Seamless integration with Miami-Dade County e-mail system

Limit scope of pilot project

The Working Group recommends that the identified pilot project should be of limited scope, be conducted with the direct assistance of the selected vendor. In addition, a thorough evaluation of the product should be conducted prior to rolling out the technology to other departments.

Adopt process reengineering policy

Workflow is of critical importance because it offers more tangible benefits than any other function of an EDMS. In order to implement workflow properly, and to take full advantage of its capabilities, implementing departments must be willing to reengineer their business processes.

Take full advantage of out-of-the-box functionality

One of the essential reasons the FYI product of Identitech was selected for evaluation in a pilot project was the functionality that can be implemented without significant custom development. It is recommended that the county take advantage of this feature and exploit the native functions in the software without investing significant resources in custom development projects.

Appoint EDMS administrator

The Working Group recommends that an EDMS Administrator be identified and tasked to manage and evaluate the pilot project and to develop a long-range plan for the introduction and use of EDMS technology in Miami-Dade County. The EDMS administrator should work closely with departmental representatives to ensure that clear goals and objectives for the pilot project are developed. The EDMS Administrator should have a staff capable of facilitating the introduction of technology, with skills in requirement analysis, project planning, business process redesign, project management, project evaluation, etc. This Administrator and his/her team should report to the CIO.

Establish EDMS implementation team

The Working Group recommends that an EDMS Implementation Team be created. This team would report to the CIO through the EDMS administrator and focus on the initial stages of the system development life cycle, such as establishing business requirements, conducting needs assessment, planning for personnel retraining, and the like. However, while internal staff best performs this function, an alternative would be to use an integrator to help move the technology out to departments.

Identify and establish core competencies

The CIO should develop and implement policy related to the core competency of the technologies required for EDMS technology. In this regard, the CIO should clearly define the

role and responsibilities of ITD as they relate to the implementation of web-based and distributed systems.

Engage strategic consultant

The Working Group recommends that the CIO engage an external IT consultant to assist in the formulation of a strategic plan that encompasses the full range of technologies under review by CIO-created Working Groups. This would include, at a minimum, EDMS, e-government, and portal strategy. This strategic IT consultant should be available to provide guidance, through the EDMS administrator, to departmental staff in the development of tactical implementation plans and in evaluating progress toward goals.

Implement records management retention principles

As the EDMS is implemented, more and more documents will exist only in electronic form. Retention schedules are now routinely applied to paper-based documents and to master databases maintained at ITD. These same principles should be maintained as the county migrates toward a paperless work environment that includes managed documents as well as e-mail. . This would include, compliance with the Public Record Law; ensuring that each record has a retention schedule with an established retention period; verifying vital or historical records; and final disposition of records. While not responsible for the management of official records, the CIO should insist that as EDMS are implemented, records management retention standards be appropriately applied to electronic documents.

Outsource backfile scanning

A number of departments have a requirement to scan substantial numbers of documents now stored in file rooms. It is recommended that Miami-Dade County provide centralized management of contracts to perform scanning and indexing of these paper documents on behalf of departments. Significant economies of scale can be achieved if this function is managed for the enterprise instead of by each department individually.

Implement master document repository

It is recommended that Miami-Dade County identify the requirements of, and take steps to implement, a centralized document storage and archival site at ITD. This site should be maintained for the benefit of all county departments and include all necessary hardware and software to support the near-line, backup and archival needs of the EDMS.

Appendices

Glossary of Terms

Access: Permission to use and reproduce records; may be limited or qualified (restricted) by the agency that has legal custody of the records.

Active X Technology: ActiveX is an open, cross-platform set of technologies for integrating components on the Internet and has been widely adopted by corporate MIS and vendor communities. As the leading commercial object model, ActiveX is used by millions of application and content developers today. Hundreds of vendors currently market over 1,000 ActiveX Controls.

ANSI: (American National Standards Institute). The U.S. standards organization that establishes procedures for the development and coordination of voluntary American National Standards. Note: Member bodies of ISO include, among others, the American National Standards Institute (ANSI), the Association Française de Normalisation (AFNOR), the British Standards Institution (BSI), and the Deutsche Institut für Normung (DIN).

API: Application Program Interface: A formalized set of software calls and routines that can be referenced by an application program in order to access supporting services.

Archiving: Removing information from on-line to off-line storage, often using a hierarchy of storage devices (i.e. electronic imaging disc, disk caches, etc.)

Bar Code: A bar code (often seen as a single word, barcode) is the small image of lines (bars) and spaces that is affixed to retail store items, identification cards, and postal mail to identify a particular product number, person, or location. The code uses a sequence of vertical bars and spaces to represent numbers and other symbols. In an imaging system, forms can be preprinted with bar codes so that this information can be read when the forms are scanned.

Bit-map (ped): A matrix of thousands of small dots or pixels, each of which is stored as a single binary digit (bit) in a computer.

CCITT: Abbreviation for International Telegraph and Telephone Consultative Committee - a predecessor organization of the ITU-T

CD-E: (Computer Disk-Erasable). An electronic imaging platter than can be erased and rewritten. Synonymous with rewritable disk, but not to be confused with CD-R disk, which is recordable once only.

CD-R: An electronic imaging platter than can be recorded by the user with relatively low-cost equipment. Like WORM disks, once recorded, CD-R may not be erased or rewritten.

Compound Documents: A document consisting of multiple components in different formats. A Word document containing an embedded graphic or spreadsheet is an example of a compound document.

Collaboration: The set of functions and capabilities of a system that promote the joint development of electronic documents by multiple individuals or work groups.

COLD (Computer Output to Laser Disk): COLD is most commonly used as a print replacement solution for mainframe reports. In the context of EMDS systems, however, mainframe reports can be output in formats acceptable for input into the managed document repository.

Corporate Portal: Corporate portals assemble and package resources from corporate networks and the Internet to create new, personalized Web experiences.

DASD: (Direct Access Storage Device). The disk drive subsystem of a computer, usually a mainframe.

DBMS: (Database Management System). A software program that provides a systematic approach to storing, updating, and retrieval of information stored as data items, usually in the form of records in a file, where many users access common data banks.

Document: A material object upon which information is written, transcribed, or recorded.

Document Management: Document management (DM) software addresses a common organizational problem – the difficulty of retrieving and managing electronically generated unstructured information in an efficient manner. Document management tools facilitate the needs of multiple users who work on a single document or a group of documents, regardless of document format. Document management tools give organizations the ability to profile electronically created files for fast and easy retrieval. The software allows documents to be associated with indexes that describe the file, such as document type, author, application, etc. In addition, the software tracks revision made to documents and provides added security.

DPI: DPI (dots-per-inch). One relative measure of the quality of display and output devices.

E-business: "Electronic business," derived from such terms as "e-mail" and "e-commerce" is the conduct of business on the Internet, not only buying and selling but also servicing customers and collaborating with business partners. One of the first to use the term was IBM, when, in October 1997, it launched a thematic campaign built around the term. Today, major corporations are rethinking their businesses in terms of the Internet and its new culture and capabilities. Companies are using the Web to buy parts and supplies from other companies, to collaborate on sales promotions and to do joint research.

E-commerce: Electronic commerce is the buying and selling of goods and services on the Internet, especially the World Wide Web. In practice, this term, and a new term, "e-business", are often used interchangeably. For online retail selling, the term "E-tailing" is sometimes used. E-commerce can be divided into: E-tailing or "virtual storefronts" on Web sites with online catalogs, sometimes gathered into a "virtual mall".

Encryption: The process of changing a digital message (from plaintext to cipher text), so that it

can be read only by intended parties (also called enciphering), or to verify the identify of the sender (authentication), or to be assured that the sender really did send that message (nonrepudiation).

Imaging: Document imaging is an essential component of efficient electronic document management systems. Imaging systems convert "human readable" documents (usually paper) into "computer readable" formats (electronic images). Imaging systems provide organizations with the ability to capture, store, archive, and retrieve document images. While the core of any imaging system is the back-end image management architecture, enterprise-imaging systems can encompass many other technologies, such as optical storage and print/fax subsystems. The TIFF (tagged image file format) standard is the commonly accepted image file format; it is supported by all imaging vendors and is interchangeable across systems. Another new format standard gaining acceptance is Adobe's PDF (portable document format), but it has yet to be universally accepted by imaging vendors.

ISO: (International Organization for Standardization). An international organization that (a) consists of member bodies that are the national standards bodies of most of the countries of the world, (b) is responsible for the development and publication of international standards in various technical fields, after developing a suitable consensus, (c) is affiliated with the United Nations, and (d) has its headquarters at 1, rue de Varembé, Geneva, Switzerland.

JPEG: (Joint Photographic Experts Group) A standard for the compression and coding of still, continuous tone, color or grayscale images. JPEG compression is most effective on natural images such as photographs or digitized video frames. It is capable of compressing a 24-bit color image 75:1 or even greater in "lossy" modes. Joint refers to a combined group of ISO and ITU-T experts.

Meta-Data: Large amounts of data that is created and saved in digital data storage systems, for use in retrieving information such as: text, images, video, audio, tables, arrays, graphics, algorithms and procedures, and documents.

ODMA: (Open Document Management Architecture) A standard API, that enables any application to interface seamlessly with any DMS (document management) client. While ODMA provides for simple interaction of applications and DMS clients, the DMA (Document Management Alliance) specification defines the interaction between them.

OLE: (Object Linking and Embedding). A method used by Microsoft's Windows products to integrate the output from one program as data into another (for example, a drawing into a word processing document).

Optical Character Recognition: OCR (optical character recognition) is the recognition of printed or text characters by a computer. This involves scanning of the text character-by-character, analysis of the scanned-in image, and then translation of the character image into character codes, such as ASCII, commonly used in data processing. In OCR processing, the scanned-in image or bitmap is analyzed for light and dark areas in order to identify each alphabetic letter or numeric digit. When a character is recognized, it is converted into an ASCII

code. Special circuit boards and computer chips designed expressly for OCR are used to speed up the recognition process.

OSI: (Open Systems Interconnection). A suite of protocols and standards sponsored by the ISO for data communications between otherwise incompatible computer systems.

Out-of-Box Functionality: Feature-rich software requiring minimal customization and programming to meet the needs required. Minimal third-party product required for complete functionality.

Plug-In: A program required to be downloaded by each user via a web browser in order to access information on the servers. Generally considered a negative especially if it is larger than a few Kilobytes.

Records Management: The primary purpose of a records management system (RMS) is to manage the risk and cost created by your organization's information (as embodied in physical and electronic form). Any type of business document (forms, invoices, correspondence, orders, etc.) can be classified as a "record." Once it is designated a record, the document is no longer managed by the creator, but by the organization – a fundamental difference from document management. The organization can choose to categorize the record in different ways, retain it for a certain length of time, and destroy it when the company is no longer obliged to retain it.

Traditionally, organizations performed records management in response to industry regulations or to protect themselves from liability. The discipline of records management grew out of these business requirements. Likewise, the first records management systems were designed to help records managers with their tasks. Today, the capabilities of RMS products have been expanded to handle electronic records, and to involve end users in the record classification and retrieval process. Many organizations now look at their records repositories as powerful group memories, as opposed to liabilities that must be controlled.

Storage/Archive: An essential component of any EDMS deployment is storage. All systems need cost-effective ways to archive documents and data, and to make the information available to users when needed. One of the more commonly used storage technologies is the jukebox. Jukeboxes are available for both CD and optical disk. These so-called "near-line" storage devices typically offer less expensive storage than on-line options such as magnetic hard drives. Jukeboxes also can hold extremely large libraries of information, and they can give users networked access to the data. Another important technology is jukebox management software. This software acts as the intermediary between users and the device, giving users access to the data and handling all user requests and file transfers. In most cases, the jukebox appears to the user as another logical drive. In addition, the software includes performance-enhancing capabilities that can help jukeboxes achieve retrieval speeds approaching those of on-line storage alternatives.

SQL: (Structured Query Language). An English-like standardized language that is used to define and manipulate data stored in a database. Four main data manipulation statements are: Select, Delete, Update, and Insert.

TCP/IP: (Transmission Control Protocol/Internet Protocol). Two inter-related protocols that are part of the Internet protocol suite. TCP operates on the OSI Transport Layer and breaks data into packets. IP operates on the OSI Network Layer and routes packets. TCP/IP was originally developed by the U.S. Department of Defense.

Thin Client: "Thin client" is a synonym for the Net PC or the network computer, personal computers for businesses that are designed to be centrally-managed, configured with only essential equipment, and devoid of CD-ROM players, diskette drives, and expansion slots (and therefore lower in cost). The term derives from the fact that small computers in networks tend to be clients of local area network and other servers. Since the idea is to limit the capabilities of these computers to only essential applications, they will tend to be purchased and remain "thin" in terms of the client applications they include.

Thick Client: A full-blown PC capable of stand-alone processing. A client in a client/server system that is capable of performing some processing without reliance on the server.

TIFF: (Tagged Image File Format). A file format used to store an image using the particular data structure of the file.

TWAIN: (Toolkit Without An Interesting Name). A standard software interface for imaging data from raster image-generating devices (for example, from document scanners, video-frame grabbers, and digital cameras, which produce horizontal scans digitizing the intensity and possibly the color of the image) so they can be input into graphics applications.

Workflow: Workflow systems are designed to automate business processes. Workflow processing technology is quickly gaining momentum as companies move toward more efficient, "paperless" offices. Production workflow systems allow organizations to define a routing and processing scheme that automates an orderly business process.

Whether stand-alone or as part of an imaging implementation, workflow systems provide organizations with faster response time, increased productivity, improved customer service, and tighter quality controls. In addition to transaction-oriented production workflow products, new offerings are emerging to handle collaborative, administrative, and ad hoc workflows.

WORM: (Write Once, Read Many). A storage device that can be written to by an end user – but only once (it is non-erasable, but sometimes it can be written to incrementally until it is full). Examples include non-erasable optical and CD-R storage media (often used for archival backup).

EDMS Feature Checklist

Date:

Vendor:

Product:

Core Features

- Recent work-list or drawer feature?
- Repository support for multiple file formats (BMP, TIFF, JPEG, AVI, etc)?
- Number of metadata fields supported (standard, user defined)?
- File/folder metaphor for view (i.e. Windows Explorer)?
- Support folder within folder? Limit?
- Support spell checking of user entered information?
- Support Drag & Drop (i.e. For burning a CD in an Explorer like view)?
- Customer or third party viewer? Third party which one?
- Date/time stamping of comments or notes?
- Support for Watermark? Placement?
- Support Related Document or folder feature?
- Support Redaction?
- Support Highlight?
- Support Stamping?
- Support Thesaurus?
- Support Annotations?
- Support Sticky Notes?
- Support Subscription? To file or folder?
- Support for batch and after scanning indexing?
- Which search engine is used?

Desktop Integration

- WinNT security synchronization?
- Support cut & paste from viewer?
- Are date created, author, and other properties from MS Office products captured?
- How do they deal with MS imbedded links to external documents?
- Intercept MS Office products at Save or Save As time?
- Intercept in-bound and out-bound MS Outlook emails?
- How are Emails with attachments stored?
- How are Emails with attachments that have external links (shortcuts) stored?

Security

- WinNT security synchronization?
- Security defined at file or folder?
- How do they deal with confidential files in a folder of public records?
- How do they deal with confidential materials (i.e. a page) of a multiple page document?
- Security inheritance?

Audits

- Chain-of-Custody validation?
- What metadata is captured from a Web user (i.e. IP address, computer name, etc.)?
- What standard reports are available?

Scanning

- Third party? If so, who?
- Support batch queues?
- Support import from a batch?
- Audit controls (records read, records written) of batch queues?
- Reports?

Work Flow

- Graphical interface?
- Support Serial & Parallel?
- Support for Outlook?

System Maintenance

- How do they deal with duplicate document?
- How do they deal with empty folders?
- How do they deal with rebuilding indexes?
- How do they deal with orphan records?

Web Component

- Support on demand conversion of images/documents to PDF?
- Plug-in required?
- Browser supported?
- Java or ActiveX?

IT Architecture

- Support user defined multiple databases (i.e. Building, DERM, Fire)?
- Can search engine search across the multiple DB (in parallel)?
- Support central and distributed repositories?
- What DBMS are supported?
- Are images and documents stored in the DBMS?
- Two tier or three tier client server?
- MS Windows 32 bit client?
- MS Windows2000?
- Document stored in?
- Index stored in?
- Support for Network Attached Storage?
- Support color scanners?

- Support E size scanners?
- Are images (i.e. TIFF) stored in their native formats (no header or trailers)?

Vendor Profile

- How long have they been in business?
- What assurance exists that parties stay within release compliance?
- DOD 50.15.02 certification?
- AIIM Standards Document Management Alliance (DMA)?
- AIIM Standard Open Document Management Alliance API (ODMA)?
- AIIM Standard Workflow Management Coalition (WfMC)?
- AIIM Standard ANSI/ISO?

Workflow Checklist

Workflow and Lifecycle Capabilities Questionnaire:

Questions & Functionality:	Y/N/NA/F/C*
<i>Is the workflow product yours or OEM? From whom?</i>	
Since what release of your product has workflow been incorporated?	
Is any programming required to maintain connectivity?	
Is a full feature graphical user interface available?	
<i>Is workflow integrated at the server level?</i>	
Does it use the same repository as your document services?	
Is a plug in required to participate over the Web? If so, what size is it?	
Is the browser client freely distributable? If not, what is the cost?	
Functionality:	
Can templates be created and reused?	
Creation of simple or complex workflow.	
Support conditional routing, so that task will be automatically forwarded according to business rules and document properties.	
Can workflow be launched or initiated from the web?	
Reassignment of tasks, which allows a task to be reassigned to a designated alternate in the event the original user, is unavailable.	
Routing to a group of users, in which either one member or all members are responsible for a task.	
Voting, in which a task may be considered completed after a certain number of reviewers has signed off.	
Branching to sub-tasks.	
Ability to send a single document, folder or set of documents.	
Notification of task events, such as receipt of a task, completion of a task, or schedule notification.	
Fully integrated with MS-Outlook to enable user to participate fully in workflow?	
Support parallel processing?	
Support linking of "departmental" workflow?	
Audit trails with time stamps throughout the process	
Ability to determine where in the process the item is at any time	
Ability to generate statistical information. Average time spent in process? Total time to process? Identify bottlenecks? Turn around times for each step.	
Ability to setup alerts via email?	
Ability to send an email at predefined stages or based on events in the process?	
Ability to send a fax at predefined stages or based on event in the process?	
Support Rendezvous?	
Automatic Load Balancing	
Rules Events	
Triggers	
Time-Based Routing	
Roles-Based Routing	
Workflow design versioning	
Exception handling	
Support for electronic forms (i.e. Jet Forms, Adobe, etc.)?	

- "Y" Yes out of the box; "N" Not out of the box; "NA" Not applicable or can not be done "F" Future enhancement or third party add-on, "C" Customization required

Product Technical Requirements

EDMS and its corollary technologies must comply with the following technical requirements: The desired EDMS software must support documents of various format types such as images, desktop office application documents, voice, video, e-mail messages, etc.

- Open, Multi-tiered web-based architecture;
- Support for ODMA for desktop client application integration;
- DMA for Document Management repository interoperability is mandatory;
- WEBDAV for authoring clients to WEB servers;
- Be scaleable enough to support various size implementations - section, division, department, agency, council, commission, etc. in a cost-effective manner. This not only implies ability to increase users and storage, but also that the system is truly distributed, allowing objects to be available to the user wherever they (and the user) reside;
- Ability to store, locate, manage, and retrieve 'information objects' across a variety of platforms, databases, protocols, and network operating systems;
- Must provide a comprehensive, flexible document index for every 'information object' and make these indices available to the end users for search criteria;
- Ability to search remote file servers (remote repositories/libraries) automatically;
- Ability for full text content and/or index search;
- Ability to search Wide Area Networks as easily as Local Area Networks;
- Ability to create and maintain document versions and renditions, allowing management and tracking of the document or object series over time;
- Ability to Check-in and Check-out 'objects' based on the access control permissions assigned to users and groups;
- Must use security services available in the platform OS to allow single user and group administration across the enterprise; Multiple levels of security;
- Ability to maintain complete Document History;
- Inclusion of Hierarchical Storage Management (HSM);
- Ability to support and integrate capabilities of multiple text processing, imaging, COLD, and workflow engines;
- Must provide a wide range of object-based Application Program Interfaces (APIs) for ease of application integration;
- Must provide comprehensive remote-access system administration capabilities available through a standard WEB browser;
- Provide the automated ability to publish documents to a standard Web server;
- Ability from a standard mail client to save mail messages and their attachments as 'managed objects' and retrieve them;
- Support for remote and/or mobile users, who may not have access to state network at any given time;
- Automatic synchronization of documents for 'remote' users;
- Ability to create a firewall between users, documents, and document indices;
- An object-oriented tool set to aid in building customized applications;
- At a minimum, comply with the following industry standards:
 - Active X Technology

Messaging Application Program Interface (MAPI)
Document Management Alliance (DMA)
Open Document Management APIs (ODMA)
OLE DB

Records Management Checklist

PART I - ELECTRONIC RECORDKEEPING SYSTEM

The following records management functional specifications should be incorporated into the Electronic Document Management System:

Features	Y/N/NA/F/C*
a) The ERS should <i>contain a records retention module</i> for defining record series or classification. Allow only authorized individuals (a Records Manager and/or other personnel specifically designated by the Records Manager as responsible for managing various aspects of an organization's records) to create, add, edit, and delete record series and their retention schedule codes. The following fields should be part of the records retention module:	
▪ Record Series Title or Description - A description of a particular document or group of documents.	
▪ Records Retention Schedule Code - The State's alphanumeric code indicating a unique record series that can be assigned to one or more document.	
▪ Records Retention Period - The length of time that a record must be kept before it is disposed of.	
▪ Disposition Date - The fixed date on which the record becomes due for final disposition. Disposition can mean destruction or transfer to another location.	
▪ Disposition Authority - Legal approval from the State to dispose of public records and/or transfer of permanent records.	
▪ Vital Record Indicator - Essential records that are needed to meet operational responsibilities under emergency or disaster conditions, or to protect its legal and financial rights.	
b) The ERS should <i>provide the ability to link electronic records to the records retention module</i> . This will allow us to relate records to entries in the records retention module by assigning the records retention code to records as another index entry.	
c) The ERS should <i>provide the capability to link original superseded records to their successor records</i> . If the disposition of the superseded record is to be destroyed when replaced, the system should identify that the record is eligible for destruction.	
d) The ERS should <i>manage and preserve any record regardless of its format or structure</i> , so that it can be reproduced and viewed in the same manner as the original.	
e) The ERS should <i>link the records metadata</i> (values of the record profile attributes) to the record so that it can be displayed when needed and transported with the record when a copy is made or transmitted to another location.	
f) The ERS should <i>provide the capability for only authorized individuals to modify the metadata</i> of stored records that have not been specified as un-editable.	
g) The ERS should <i>dynamically recompute destruction dates when the records retention period changes</i> . Using the code assignment or linking in requirement 2, it must be able to detect changes in the retention period before recalculating the destruction date. The new destruction date should appear on the screen and in all subsequent reports.	
h) The ERS should <i>be able to calculate the records destruction dates based on records retention periods or formulas</i> . The system would be to interpret and apply the following retention periods or formulas:	
▪ Creation-driven - retention calculated from the date the record was created (e.g.,	

Features	Y/N/NA/F/C*
3, 3 years, 3 fiscal years).	
▪ Event-driven - retention calculated from an event date (ex. after termination, after audit, upon expiration).	
▪ Indefinite - retention permanent or a special destruction order is approved (records are not destroyed unless an authorized person approves destruction based on a special order).	
▪ Maximum - retention calculated based on a maximum amount of time (e.g., MAX3, a maximum of 3 years or MAXACT, maximum retention is the active period).	
i) The ERS should <i>permit a hold to be placed on records so that the records cannot be destroyed, even if the retention period has expired</i> . A hold mechanism prevents selected documents, files, or other grouping of information subject to litigation, government investigation or audit from being destroyed, until an authorized release is received.	
j) The ERS should <i>identify records eligible for destruction</i> (e.g., the retention period has expired and there are no holds). It should give us the ability to produce a listing of records due for destruction based on their destruction dates and the absence of a hold.	
k) The ERS should <i>mark records for bulk destruction</i> after approval. Execution of records destruction commands should be restricted to the Records Manager.	
l) The ERS should <i>safely and completely oversee destruction of records approved for destruction</i> , once records management initiates the destruction process based on the type of media.	
m) The ERS should <i>maintain information to indicate that records have been destroyed under the program procedures</i> . A log should note that all records authorized for destruction have been destroyed.	
n) The ERS <i>does not permit destroyed records to be recovered through backups, unerase mirror image directories, or other mechanisms</i> . The system destroys electronic records using a secure erasure procedure that precludes the retrieving or reinstating the record.	